SECTION 4.6

OIL & GAS PRODUCTION
GAS STRIPPING

(New - November 1986; Updated - August 1990)

EMISSION INVENTORY SOURCE CATEGORY

Petroleum Production and Marketing / Oil and Gas Production

EMISSION INVENTORY CODES (CES CODES) AND DESCRIPTION

310-352-0100-0000 (83451) Wet Gas Stripping - Field Separator Fugitive Losses

310-354-0100-0000 (83469) Dry Gas Stripping - Field Separator Fugitive Losses

310-995-0100-0000 (46441) Other

METHODS AND SOURCES

These categories are used to inventory the hydrocarbon emissions associated with natural gas processing.

Natural gas obtained from gas wells contains impurities such as water, carbon dioxide, and sulfur compounds. The natural gas is processed to remove impurities. Leaks in compressor seals, pump seals, valves, and fittings are the sources of fugitive emissions during natural gas processing.

The emission factor for natural gas processing was obtained from an EPA report, "Revision of Evaporative Hydrocarbon Emission Factors."[1] The EPA report relates the emissions to the amount of natural gas processed. The TOG emission factor is 150 pounds per million cubic feet of gas for both wet and dry gas stripping.

The amounts of natural gas produced by counties in California were obtained from a California Division of Oil and Gas (DOG) report, "73rd Annual Report of the State Oil and Gas Supervisor, 1987."[2] The emissions were then estimated by multiplying the DOG data by the EPA emission factor. (See Sample Calculations.)

ASSUMPTIONS

1. The emission factor in the EPA report is representative of the emissions from natural gas processing plants in California.

COMMENTS AND RECOMMENDATIONS

The emission factor listed in reference 1 may not be representative of natural gas processing plants in California, but better data are not available at this time. Emissions from gas production vary significantly from one location to another. Size, age, and maintenance procedures play important roles in determining the actual emissions. The wet and dry gas should be in separate categories.

DIFFERENCES BETWEEN THE 1983 AND 1987 EMISSION ESTIMATES

The 1987 emissions are greater than the 1983 emissions. The change in emissions is due to the increase in gas production in 1987.

TEMPORAL ACTIVITY

The annual, weekly and daily activities for gas production are uniform throughout the year, seven days a week, and twenty-four hours a day.

SAMPLE CALCULATIONS

Emission estimates for Kern County in 1987 from natural gas processing:

Emissions = (Amount of N/G processed in Kern County in 1987) x (Emission Factor)

= (164,649 million cubic feet)(150 lbs TOG/million cubic feet)/2000 lbs/ton

= 12,348.7 tons/yr

REFERENCES

1. U.S. Environmental Protection Agency, Revision of Evaporative Hydrocarbon Emission Factors, EPA-450-13-76-039, August 1976.

2. California Division of Oil and Gas, 73rd Annual Report of the State Oil and Gas Supervisor, 1987, No. PROG.

PREPARED BY

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Table I
1987 Area Source Emissions
Activity: Oil & Gas Extraction
Process: Petroleum & Related
Entrainment: Process Loss
Dimn: Gas Stripping Fugitive
CES: 46441
Process Rate Unit: Million Cu Ft Processed

AB	County	Process Rate	TOG Emis. (Tons / Year)	CO Emis. (Tons / Year)	NOX Emis. (Tons / Year)	SOX Emis. (Tons / Year)	PM Emis. (Tons / Year)
NC	HUMBOLDT	3085	231.40	0.00	0.00	0.00	0.00
NCC	MONTEREY	1	.00	0.00	0.00	0.00	0.00
	SAN BENITO	1	.10	0.00	0.00	0.00	0.00
SC	LOS ANGELES	21327	1599.50	0.00	0.00	0.00	0.00
	ORANGE	5256	394.20	0.00	0.00	0.00	0.00
	RIVERSIDE	7	.50	0.00	0.00	0.00	0.00
	SAN BERNARDINO	3	.20	0.00	0.00	0.00	0.00
SCC	SAN LUIS OBISPO	944	70.70	0.00	0.00	0.00	0.00
	SANTA BARBARA	12121	909.00	0.00	0.00	0.00	0.00
	VENTURA	15303	823.30	0.00	0.00	0.00	0.00
SF	CONTRA COSTA	3742830	250.75	0.00	0.00	0.00	0.00
	SOLANO	4409136	295.28	0.00	0.00	0.00	0.00
	SONOMA	70744	4.74	0.00	0.00	0.00	0.00
SJV	FRESNO	3619	271.40	0.00	0.00	0.00	0.00
	KERN	164649	12348.70	0.00	0.00	0.00	0.00
	KINGS	1642	123.10	0.00	0.00	0.00	0.00
	MADERA	1171	87.80	0.00	0.00	0.00	0.00
	MERCED	84	6.30	0.00	0.00	0.00	0.00
	SAN JOAQUIN	23312	1748.40	0.00	0.00	0.00	0.00
	TULARE	14	1.00	0.00	0.00	0.00	0.00
SV	BUTTE	639	47.90	0.00	0.00	0.00	0.00
	COLUSA	23225	1741.90	0.00	0.00	0.00	0.00
	GLENN	12434	932.60	0.00	0.00	0.00	0.00
	SACRAMENTO	14048	1053.60	0.00	0.00	0.00	0.00
	SOLANO	36725	2754.30	0.00	0.00	0.00	0.00
	SUTTER	21590	1619.20	0.00	0.00	0.00	0.00
	TEHAMA	3447	258.50	0.00	0.00	0.00	0.00
	YOLO	13291	996.80	0.00	0.00	0.00	0.00
TOTAL		8600648	28571.17	0.00	0.00	0.00	0.00

Fraction of Reactive Organic Gases (FROG): .2700
(Reactive Organic Gases (ROG) Emissions = TOG X FROG)
Fraction of PM10 (FRPM10): .6100
(PM10 Emissions = PM X FRPM10)